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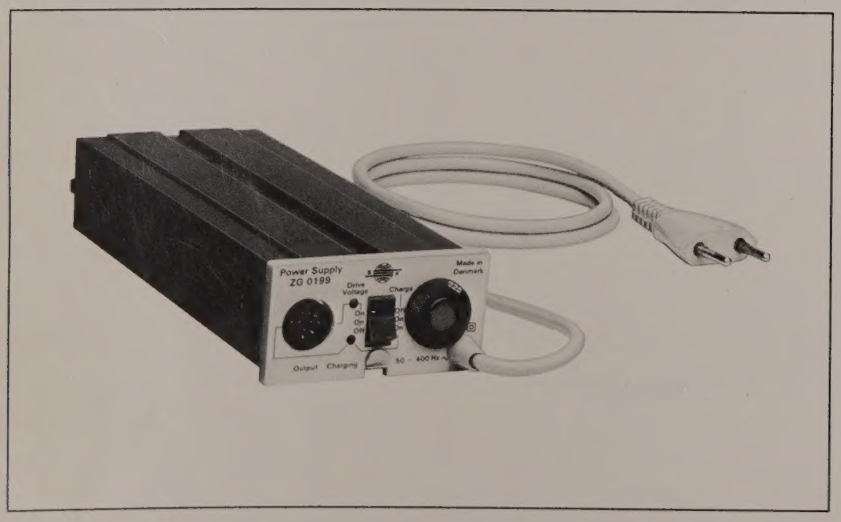
ZG 0199

Instruction Manual

Power Supply ZG 0199



A plug-in supply for mains operation of portable B & K measuring and recording instruments, such as Level Recorders Types 2306 and 2309, which have plug-in battery packs. For recharging spare battery packs outside these instruments or for recharging 1,2 V (IEC size R 20) rechargeable nickel cadmium cells for use with other instruments, a Charging Adaptor AQ 0157 and Battery Box ZG 0146 are available as accessories.

Brüel & Kjær

POWER SUPPLY
ZG 0199

Revision March 1984

This apparatus has been designed and tested according to Class II of IEC Publication 348, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. The present Instruction Manual contains information and warnings which should be followed by the user to ensure safe operation and to retain the apparatus in safe condition.

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ZG 0199

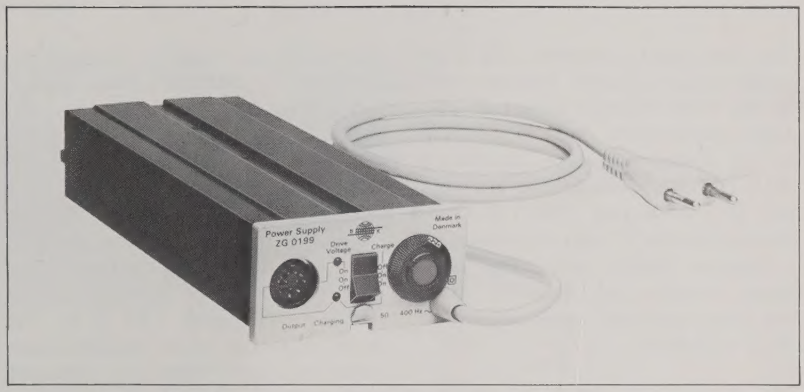
Power Supply

USES:

- Mains operation of portable measuring and recording equipment
- Recharging plug-in battery packs
- Recharging 1,2 V (IEC size R 20) nickel cadmium cells

FEATURES:

- Plugs directly into battery compartment of portable B & K instruments
- Powering and charging outputs selectable from front panel
- Extremely small stray magnetic field
- Excellent immunity from mains carried noise and transients
- Accepts mains input voltages from 100 V to 240 V (50 to 400 Hz) AC
- Double insulated. Fulfils IEC 348, safety class II



The Power Supply ZG 0199 is designed especially for mains operation of portable B & K measuring and recording instrumentation, such as Level Recorders Types 2306 and 2309, which have plug-in battery packs. It plugs directly into the battery compartment of these instruments, or may be used externally for simultaneously powering an instrument and recharging the nickel cadmium (NiCd) cells contained in the plug-in battery pack. It may also be used for recharging sets of up to six rechargeable cells (QB 0008) for use with other portable instruments using the Charging Adaptor AQ 0157 and Battery Box ZG 0146 available as accessories.

The ZG 0199 is a double insulated supply fulfilling IEC 348, safety class II. It may be powered from 100 V to 240 V (50 to 400 Hz) AC mains supplies and has a maximum power consumption of 28 VA. In addition to the mains fuse it is protected against overheating by a resetting thermal switch which operates at 80°C ± 10%. The ZG 0199 is specifically designed to obtain an excellent immunity from mains carried noise and transients and an extremely low stray magnetic field thus minimizing any influence of the Power Supply on the operation of portable measuring and recording instruments.

A block diagram of the ZG 0199 is shown in Fig.1. When it is plugged directly into the battery compartment of an instrument, a voltage of 7,5 V (1,25 A) DC is supplied via the rear plate output for powering the instrument. For power-

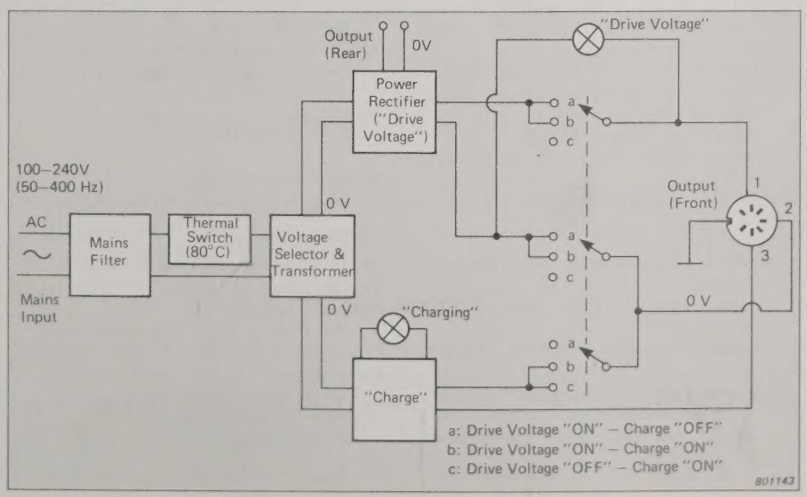


Fig.1. Block diagram of ZG 0199. External view of front panel output socket

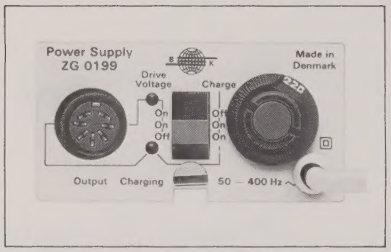


Fig.2. Front panel of ZG 0199

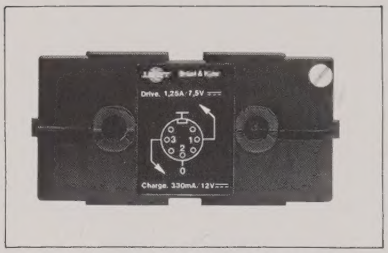


Fig.3. Rear panel of ZG 0199

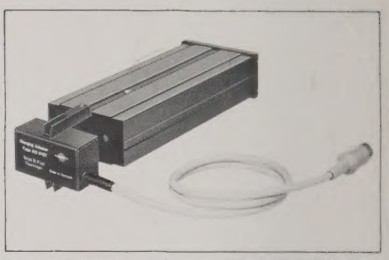


Fig.4. Charging Adaptor AQ 0157 fitted to Battery Box ZG 0146

ing instruments remotely, the front panel output is used. This connects to the EXT. POWER socket of portable instruments and, in addition to the powering voltage, provides a 12 V (0,33 A) unsmoothed DC supply for recharging the 1,2 V rechargeable NiCd cells contained in a plug-in battery pack. The front panel outputs are selected using the three position switch shown in Fig.2 as follows:

Drive Voltage "ON" — Charge "OFF". In this position the powering voltage is available from the front panel output, the "Drive Voltage" LED is lit and the "Charging" LED is off. The front and rear panel outputs share a common 0 V line.

Drive Voltage "ON" — Charge "ON". In this position both the powering and charging supplies are available at the front panel output. The "Drive Voltage" and "Charging" LEDs are lit. Front and rear panel outputs share a common 0 V line.

Drive Voltage "OFF" — Charge "ON". In this position the charging supply is available at the front panel output. The "Drive Voltage" LED is off and "Charging" LED is lit. The front and rear panel outputs have separate 0 V lines to eliminate ground loop problems.

For recharging battery packs separately, the ZG 0199 is used together with the Charging Adaptor AQ 0157. Discharged battery packs may be recharged in the laboratory, thus freeing portable instruments for field measurements equipped with a spare battery pack. Spare battery packs may be made up using the Battery Box ZG 0146 and six NiCd cells (QB 0008).

The nickel cadmium cells QB 0008 may also be used for powering portable instruments that normally accept alkaline or dry cells (IEC size R 20). They have a high charge capacity and may be recharged approximately 500 times. If less than six cells are to be recharged, Dummy Cells ZR 0017 should be used to fill the Battery Box. These ensure proper contact between the cells and limit the charging current so that the cells are not overcharged. For fully discharged cells, recharging takes approximately 14 hours.

Specifications ZG 0199

Power Output:
Via 2 pole output on rear plate (permanently connected) or via 7 pin DIN socket on front panel (selectable)
Loaded Output: 7,5 V (1,25 A) DC for 0,33 A charging current. 6,0 V (1,7 A max.) DC when not charging
Open Circuit Output: 12 V DC
Output Ripple: 1,2 V peak to peak at 1,25 A
Output Impedance: ≤ 2,5 Ω

Charge Output:
Via 7 pin DIN socket on front panel (selectable)
Loaded Output: Approx. 12 V (0,33 A) DC average
Open Circuit Output: Approx. 20 V DC average
Recharge Time: 14 hours maximum, depending on charge state of NiCd cells
Charge Line Fuse: 630 mA slow blow fuse

Mains Input:
100, 115, 127, 220 or 240 V (50 to 400 Hz) AC mains supply. Complies with IEC 348 (safety class II) and IEC 65
Power Consumption: Max. 28 VA

Mains Filter:
2 × 7 mH (0,25 Ω)

Magnetic Radiation:
< 3 A/m measured at the rear plate

r.f. Noise:
< 400 µV above 150 kHz

Operating Temperature:
–10 °C + 40 °C (+ 14 to + 104 °F)

Dimensions:
Height: 40 mm (1,57 in)
Width: 76 mm (3,0 in)
Depth: 190 mm (7,48 in)

Weight:
0,8 kg (1,76 lb)

Accessories Included:

1 7-pin DIN plug	JP 0703
1 315 mA slow blow fuse (100 to 127 V operation)	VF 0042
1 125 mA slow blow fuse (220 and 240 V operation)	VF 0030
1 630 mA slow blow fuse (charge line)	VF 0032

Accessories Available:

Extension power cable for Types 7003 and 7004	AQ 0041
Extension power cable for Types 2306, 2309 and other instruments	AQ 0035
Charging Adaptor	AQ 0157
Battery Box	ZG 0146
1,2 V (IEC size R 20) nickel cadmium cells	QB 0008
Dummy Cells	ZR 0017

2. CONTROLS

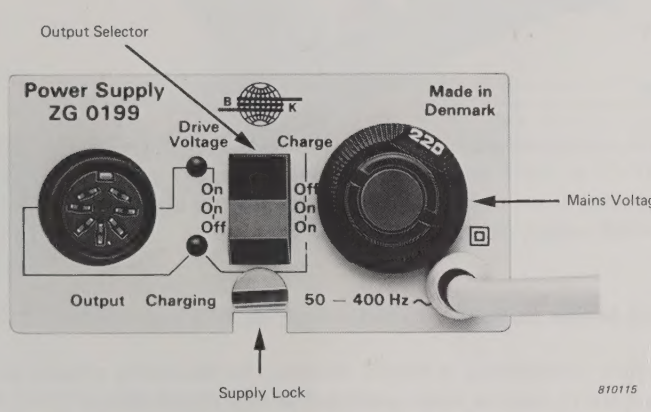


Fig.2.1. Front panel of the ZG 0199

OUTPUT SELECTOR: A three position switch for selecting the powering (Drive Voltage) and charging (Charge) supplies available at the front panel OUTPUT socket. (See section 3.2.)

OUTPUT: 7-pin DIN socket with pin designations as shown in Fig.2.2. The socket accepts plug JP 0703.

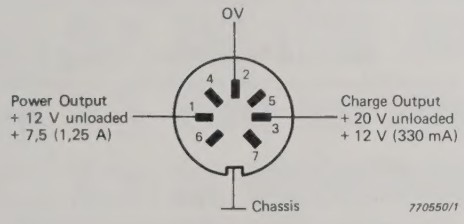


Fig.2.2. External view of front panel OUTPUT socket

MAINS VOLTAGE SELECTOR: Voltage selector for operation of the ZG 0199 from 100, 115, 127, 220 and 240 V AC mains supplies. Before connecting the ZG 0199 to a mains supply the mains voltage and fuse checks given in section 3.1.2 should be carried out.

SUPPLY LOCK: When the ZG 0199 is plugged into the battery compartment of a portable instrument, the power supply is secured and the ZG 0199 and portable instrument chasses are connected using the SUPPLY LOCK.

3. OPERATION

3.1. PRELIMINARY

3.1.1. Environment

The recommended operating temperature range of the ZG 0199 is from −10°C to + 40°C (+ 14°F to + 104°F) and it may be operated in conditions of up to 90% relative humidity (non condensing). It is protected against overheating by a self-resetting thermal switch which operates at 80°C ± 10%.

3.1.2. Connection of Mains Supply

Before connecting a mains source, the following checks and adjustments should be carried out to ensure safe operation of the ZG 0199.

Mains Voltage Setting

The ZG 0199 may be powered from a 100, 115, 127, 220 or 240 V (50 to 400 Hz) AC mains supply. To select the correct mains voltage setting, use a small coin or wide blade screwdriver to turn the MAINS VOLTAGE SELECTOR shown in Fig.2.1 until the required voltage is displayed in the SELECTOR window.

Mains and Charge Line Fuse Checks and Replacement

The mains and charge line fuse holders are shown in Fig.3.1. Access to the fuse holders is gained by loosening the cabinet retaining screw located on the top of the ZG 0199 and sliding the cabinet off towards the rear.

The mains fuse current rating is determined by the mains supply voltage. For operation from a 220 or 240 V AC mains supply a 125 mA slow blow fuse (B & K no. VF 0030) should be used. At operating voltages less than 200 V, a 315 mA slow blow fuse (B & K no. VF 0042) should be used.

A 630 mA slow blow fuse (B & K no. VF 0032) is used for further protection of the charge line of the supply. This charge line fuse need only be replaced if the "Charging" LED fails to light when the charge supply is switched on and current is drawn from this supply.

Note: Make sure that only fuses with the required rated current and of the specified type are used for replacement. The use of mended fuses and the short circuiting of fuse holders is prohibited.

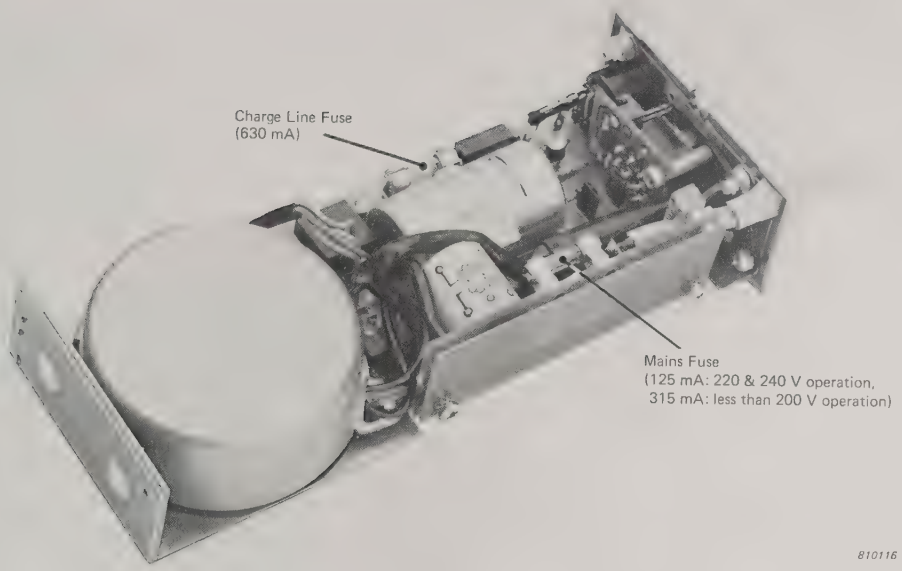


Fig.3.1. Mains and Charge Line fuses of the ZG 0199

3.2. MAINS OPERATION OF PORTABLE B & K EQUIPMENT

The ZG 0199 is designed to plug directly into the battery compartment of portable B & K measuring and recording instruments which have plug-in battery packs. An example is shown in Fig.3.2 where the ZG 0199 is used to supply power to the Building Acoustics Analyzer Type 4417. The power is supplied to the 4417 via the 2 pole output on the rear plate of the ZG 0199 and the instrument chasses are connected by the SUPPLY LOCK used to fasten the power supply in the battery compartment of the 4417.

Fig.3.2. Power Supply ZG 0199 fitted into the battery compartment of the Building Acoustics Analyzer Type 4417

Alternatively the ZG 0199 may be used for simultaneously powering an instrument and recharging the cells (rechargeable cells only) contained in an instrument battery pack. In this case the front panel OUTPUT socket is used. The powering (Drive Voltage) and charging (Charge) supplies available at this socket are selected using the three position OUTPUT SELECTOR switch as follows:

Drive Voltage "ON" — Charge "OFF": In this position the powering voltage is available at the front panel OUTPUT socket as shown in Fig.3.3 and the "Drive Voltage" LED is lit. The front panel output and the rear panel output (which is permanently connected) share a common 0 V line.

Drive Voltage "ON" — Charge "ON": In this position both the powering and charging supplies are selected (Fig.3.4). The "Drive Voltage" LED is lit and the "Charging" LED is lit when current is drawn from the charge supply. The front and rear panel outputs share a common 0 V line.

Drive Voltage "OFF" — Charge "ON": In this position the charging supply is available at the front panel socket (Fig.3.5). The "Charging" LED is lit when current is drawn from the charge supply. The front and rear panel outputs have separate 0 V lines. This switch position may be used when the ZG 0199 is used free-standing as a charge supply only or when it is plugged into the battery compartment of one portable instrument (supplying power via the 2-pole rear plate output) and used to supply charging current to the battery pack of a second portable instrument via the front panel OUTPUT socket. In the latter case, the use of separate 0 V lines for the front and rear panel outputs avoids ground loop problems when the portable instruments are used in complex measurement setups.

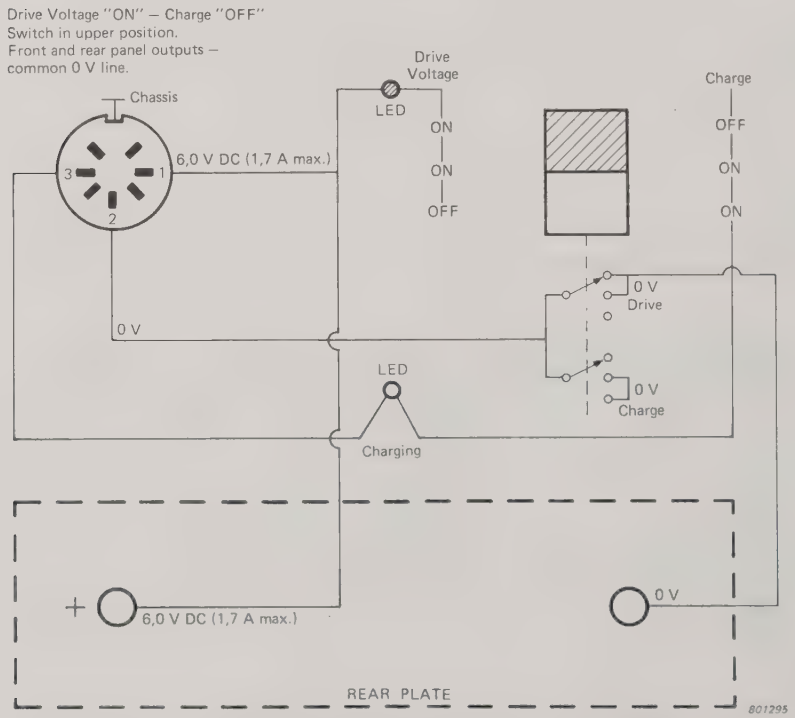


Fig.3.3. OUTPUT SELECTOR switch in Drive Voltage "ON" — Charge "OFF" setting. External view of front panel OUTPUT socket shown

Fig.3.6 shows the ZG 0199 used for simultaneously powering the Building Acoustic Analyzer Type 4417 and recharging the nickel cadmium cells contained in the plug-in battery pack of the 4417. The OUTPUT socket on the front panel of the ZG 0199 is connected to the EXT. POWER socket of the 4417 using an extension power cable AQ 0035. The OUTPUT SELECTOR switch is set to Drive Voltage "ON" — Charge "ON".

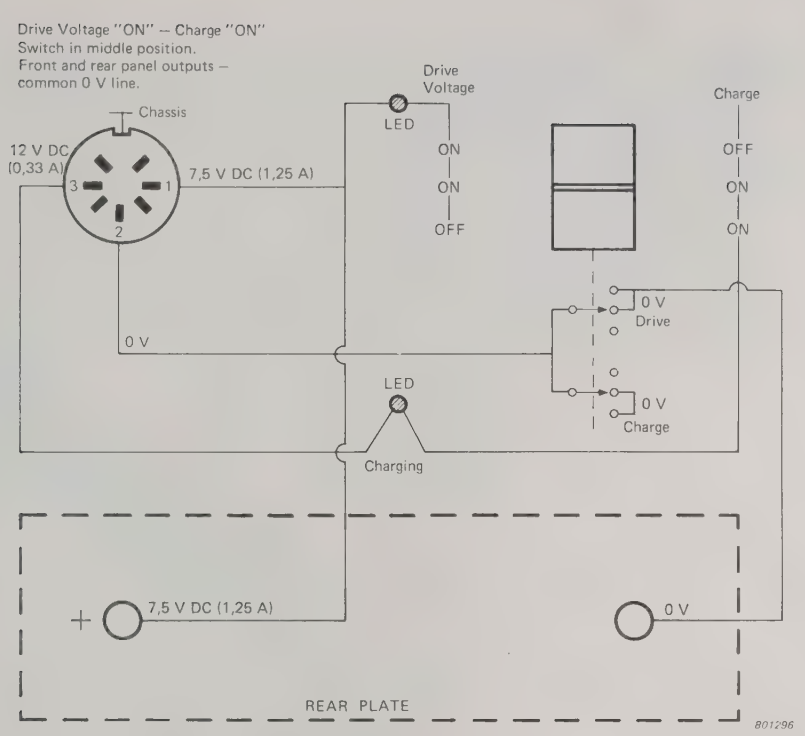


Fig.3.4. OUTPUT SELECTOR switch in Drive Voltage "ON" — Charge "ON" setting. External view of front panel OUTPUT socket shown

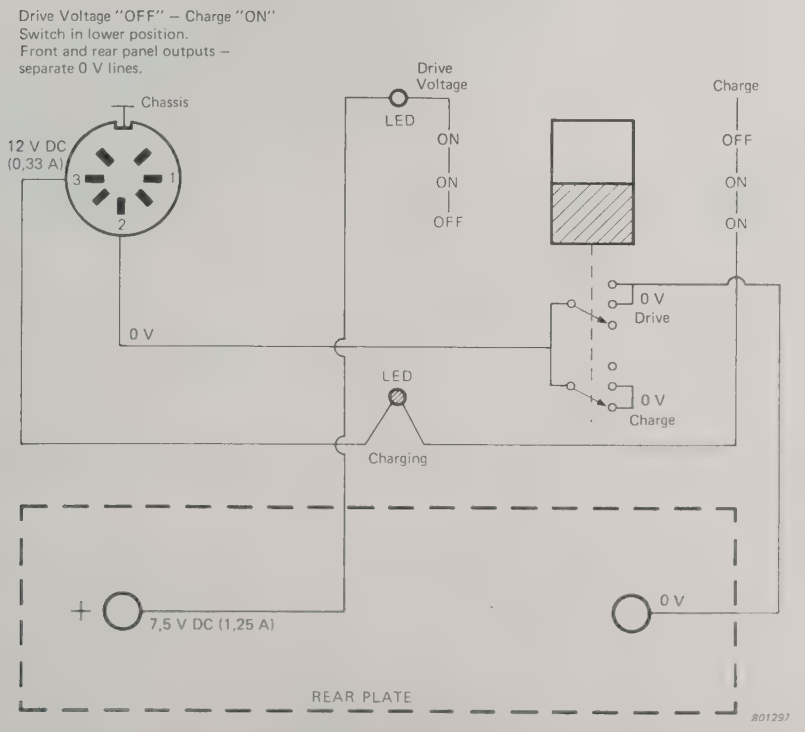


Fig.3.5. OUTPUT SELECTOR switch in Drive Voltage "OFF" — Charge "ON" setting. External view of front panel OUTPUT socket shown

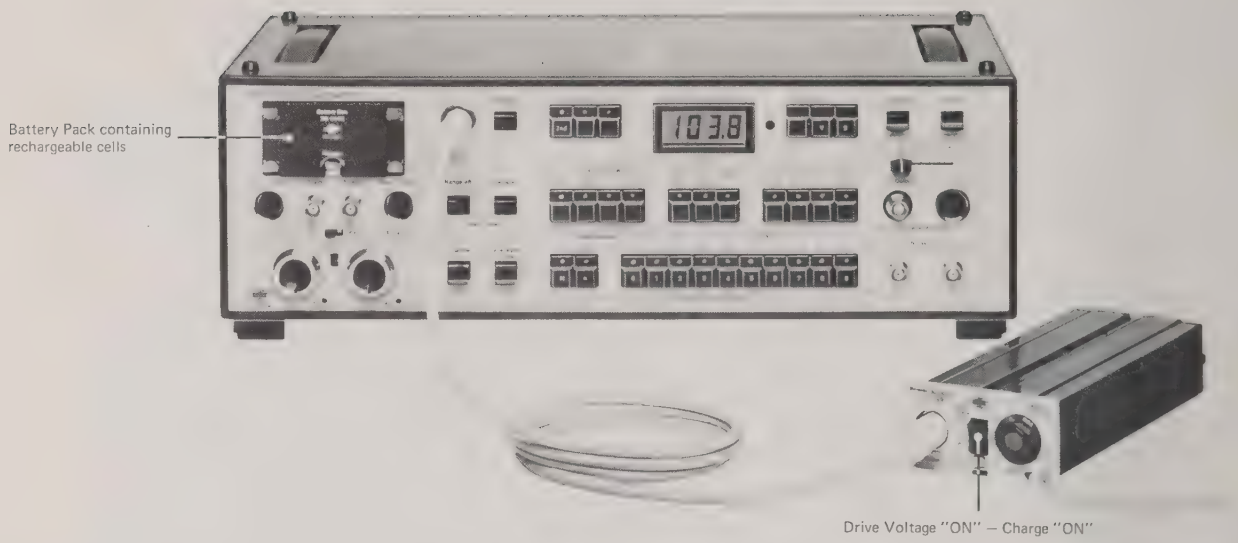


Fig.3.6. The ZG 0199 used free-standing for simultaneously powering the Building Acoustics Analyzer and recharging the nickel cadmium cells contained in the plug-in battery pack

3.3. MAINS OPERATION OF CHARGING ADAPTOR AQ 0157

3.3.1. Recharging Plug-in Battery Packs

The plug-in battery pack used by many of the portable B & K measuring and recording instruments consists of a Battery Box ZG 0146 containing either six 1,5 V alkaline cells QB 0004 or six 1,2 V rechargeable nickel cadmium cells QB 0008. Spare battery packs containing nickel cadmium cells may be recharged in the laboratory using the ZG 0199 and the Charging Adaptor AQ 0157 which is available as an accessory.

To recharge a plug-in battery pack proceed as follows:

1. Using a screwdriver release the lid of the Battery Box by turning the fastening screws through 180°.

2. If alkaline or conventional dry cells are fitted then these should be replaced by rechargeable nickel cadmium cells QB 0008. It is recommended that the battery box is marked to indicate that it contains rechargeable cells. When loading cells care should be taken to ensure that the positive pole (stud on cell casing) faces the direction indicated in each of the two compartments of the box. See Fig.3.7.

   WARNING: Do not attempt to recharge alkaline or conventional dry cells, only rechargeable type cells may be recharged. Avoid fitting rechargeable cells with their polarity reversed.

3 Replace the lid of the Battery Box and fit the Charging Adaptor AQ 0157 as shown in Fig.3.8. The Adaptor is locked in place by pressing it against the end of the box and pressing the spring loaded pins on its top and bottom forks.

   Earlier types of battery box not provided with holes for fastening the Charging Adaptor may be modified as shown in Fig.3.9.

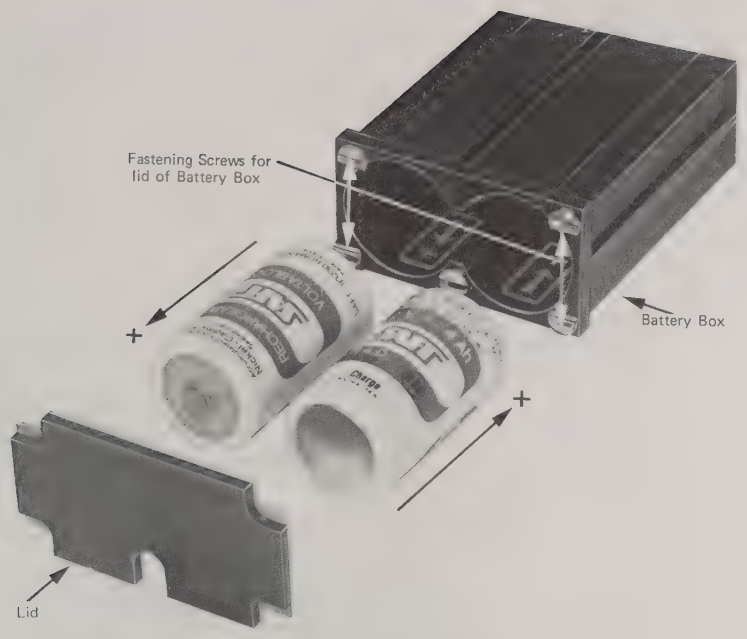


Fig.3.7. Replacement of nickel cadmium cells QB 0008

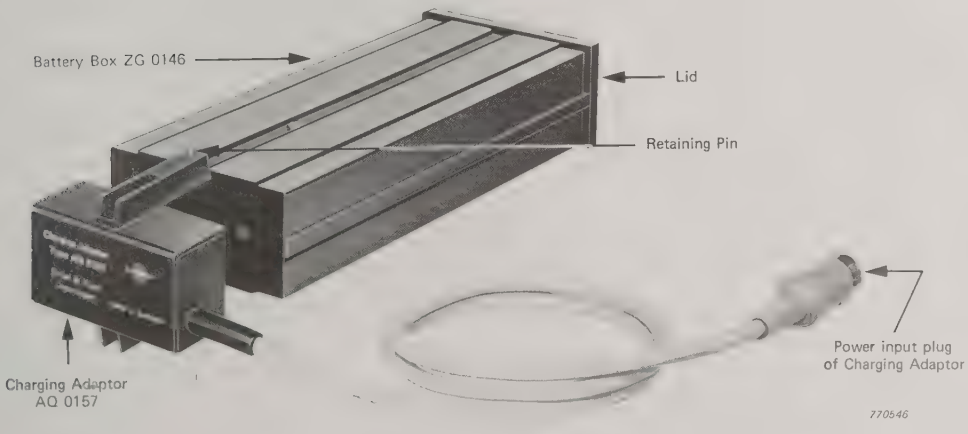


Fig.3.8. Connection of Battery Box ZG 0146 with Charging Adaptor AQ 0157

4 Carry out the preliminary checks detailed in section 3.1.2 and connect the Charging Adaptor to the OUTPUT socket of the ZG 0199.

5 Connect the ZG 0199 to the mains supply and set the OUTPUT SELECTOR switch to the Drive Voltage "OFF" — Charge "ON" position. The "Charging" LED on the front panel of the ZG 0199 should light indicating that the supply has started to recharge the cells contained in the battery box. For fully discharged cells recharging takes approximately 14 hours. There is no danger of overcharging the cells if the supply is connected for a longer period, however regular charging for a longer period is not recommended as this can reduce the battery lifetime

6 When the cells are fully recharged, disconnect the ZG 0199 from the mains supply and press the Charging Adaptor against the end of the Battery Box to release it. The

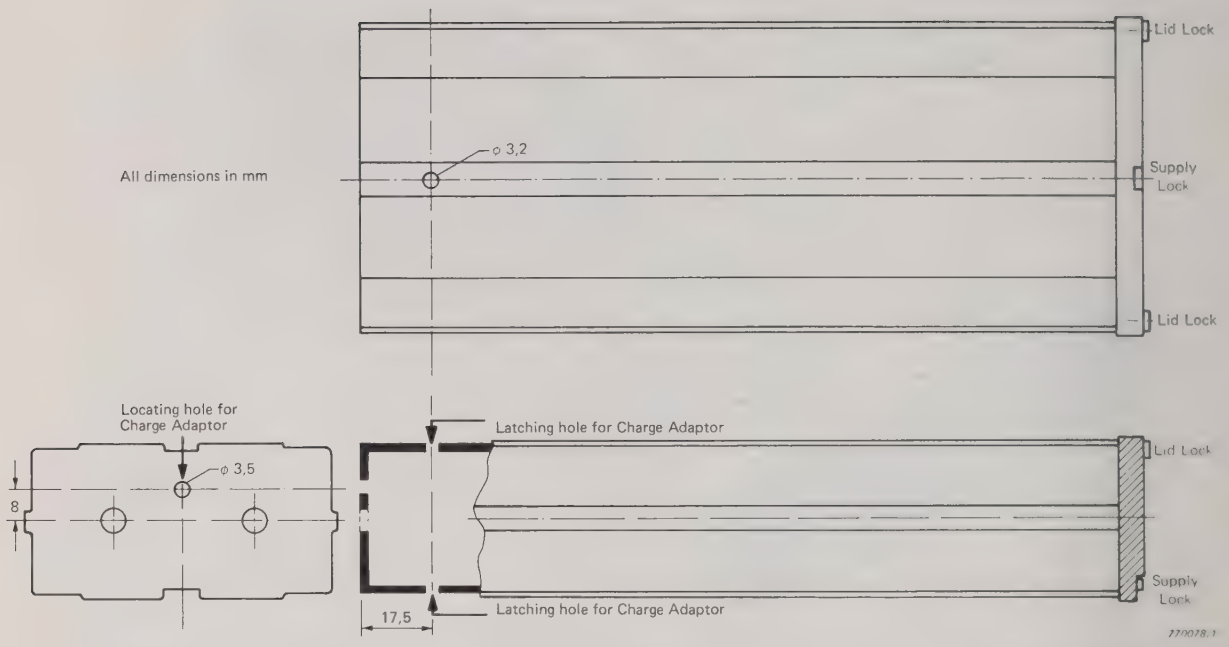


Fig.3.9. Modification of earlier Battery Boxes ZG 0073 and ZG 0106 for use with Charging Adaptor AQ 0157. The hole for the locating pin of the Charging Adaptor must be drilled near the top at the rear end of the box. If the Adaptor is fitted with its poles reversed, the cells may explode

"Battery Check" indicator of a portable instrument should be used to indicate the charge state of the cells.

3.3.2. Recharging Nickel Cadmium Cells QB 0008

In addition to being used in plug-in battery packs, the rechargeable nickel cadmium cells QB 0008 may also be used for powering portable instruments that accept 1,5 V alkaline or dry cells (IEC 86-2 size R20). The procedure for recharging the nickel cadmium cells is essentially the same as that given in section 3.3.1. If less than six cells are to be recharged, Dummy Cells ZR 0017 (available as accessories) should be used to fill the Battery Box. These ensure proper contact between the nickel cadmium cells and the Charging Adaptor and also limit the maximum charging current.

Note: Never mix sets of cells that have been used to power different instruments. The current of partially charged cells may reverse the polarity of discharged cells. It is recommended that a particular set of cells is always charged and discharged as a set. Nickel cadmium cells will slowly discharge even if the cells are not used to power an instrument and periodic charging and discharging is therefore recommended allowing the cells to complete a full charge-discharge cycle.

3.4. BATTERY OPERATION OF CHARGING ADAPTOR AQ 0157

The Charging Adaptor AQ 0157 may also be powered from a 12 V car battery permitting plug-in battery packs and sets of rechargeable cells to be recharged in the field or whilst travelling between measurement sites. The AQ 0157 is connected to the car battery via a 7 pin DIN socket (B & K no. JJ 0709) which should be wired to the battery as shown

in Fig.3.10. Before connecting the AQ 0157 to the car battery the Battery Box should be fitted to the Adaptor. This avoids any risk of short circuiting the spring loaded contacts of the Adaptor against the metal panelling in the car. The maximum current consumption of the Charging Adaptor is 400 mA.

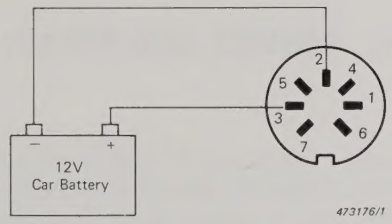


Fig.3.10. Connection of 7-pin DIN socket to a 12 V car battery for powering the Charging Adaptor AQ 0157. External view of socket shown

4. SERVICE AND REPAIR

The ZG 0199 is designed and constructed to provide the user with many years of safe, trouble free operation. However, should a fault occur which impairs its correct function and operating safety, then it should be immediately disconnected at the mains source and be secured against unintended operation. For repair consult the circuit diagram shown in Fig. 4.1 or contact your local B & K service representative. Under no circumstances should repair be attempted by persons not qualified in the service of electronic instrumentation.

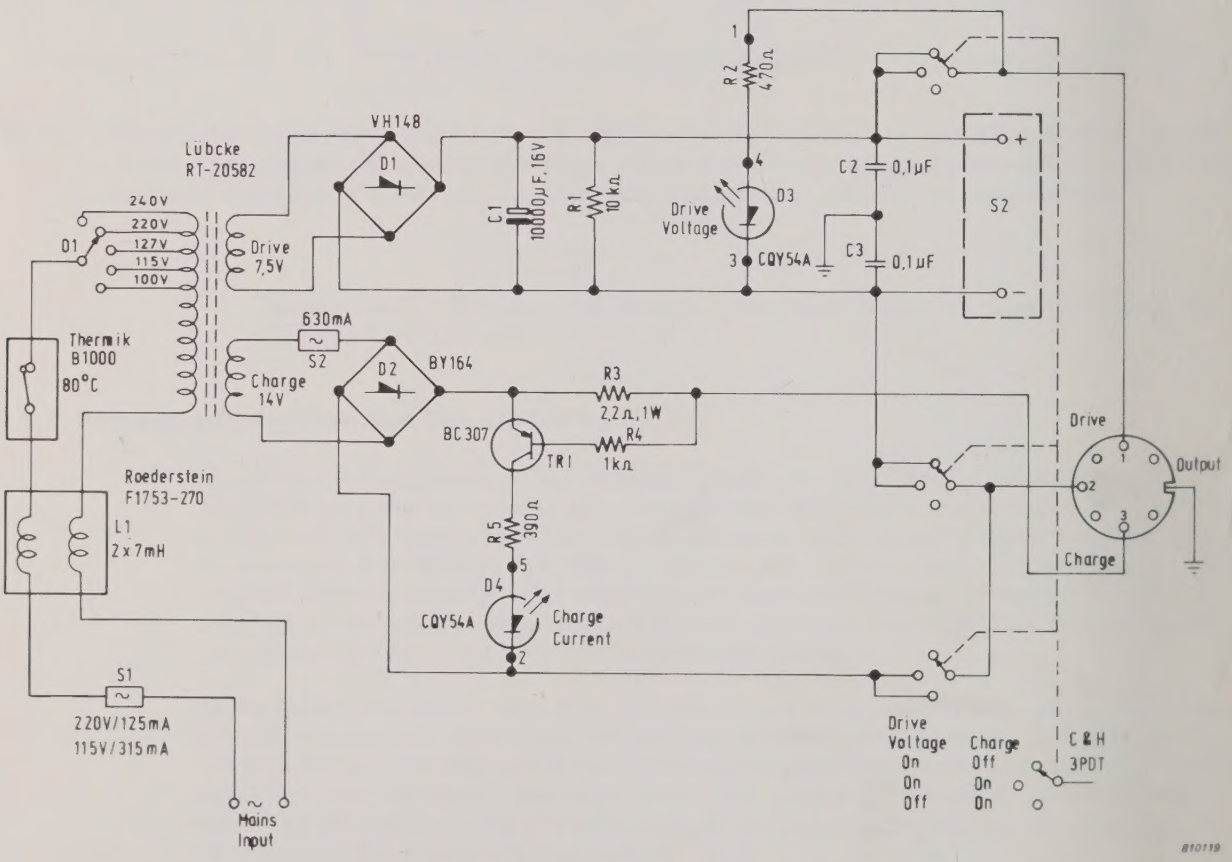
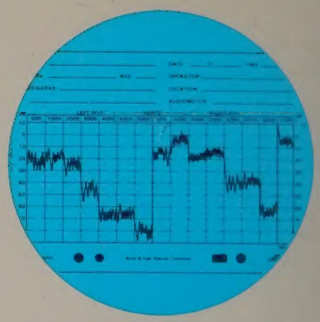
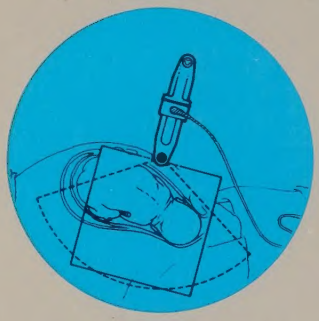
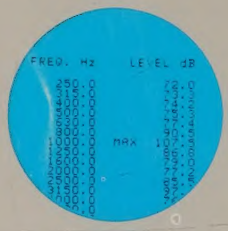


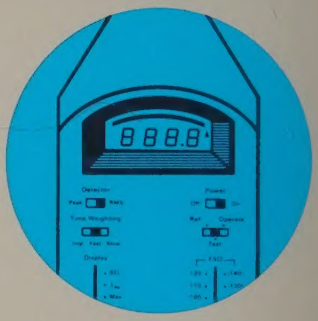
Fig.4.1. Circuit diagram of Power Supply ZG 0199

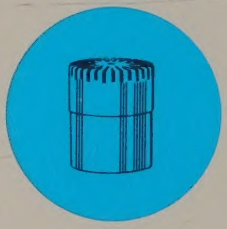
ZG 0199

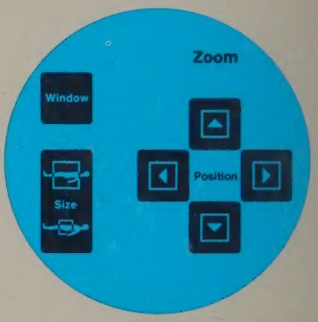


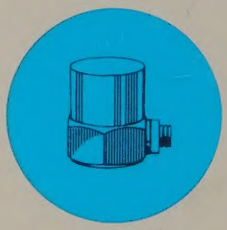


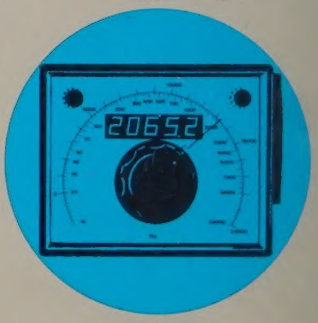


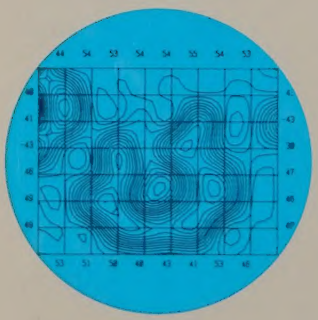


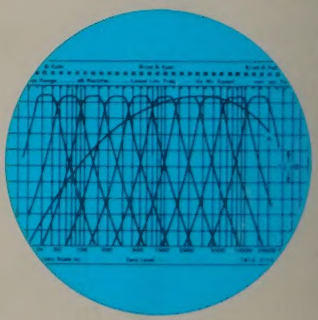












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